

fan means in fluid communication with said chamber for creating an outflow of air through said outlet; and

drive means operatively connected to said drive shaft or hub for causing said rotor to rotate.

33.<sup>2</sup> Garden refuse shredding apparatus according to Claim ~~32~~<sup>1</sup>, wherein said fan means is integral with or mounted to said mounting plate for rotation therewith.

34.<sup>5</sup> Garden refuse shredding apparatus according to Claim ~~32~~<sup>1</sup>, wherein said one or more chipper blades are elongate blades which are bolted to said mounting plate and extend partially across said mounting plate towards its periphery.

35.<sup>4</sup> Garden refuse shredding apparatus according to Claim ~~34~~<sup>5</sup>, wherein said one or more macerating means are angularly displaced from said one or more chipper blades.

36.<sup>8</sup> Garden refuse shredding apparatus according to Claim ~~32~~<sup>1</sup>, wherein said drive shaft or hub extends through a wall of said housing and said mounting plate is spaced from said wall and said drive shaft or hub between said wall and said mounting plate is enclosed by a shroud.

37.<sup>9</sup> Garden refuse shredding apparatus according to Claim ~~36~~<sup>8</sup>, wherein said shroud abuts and is secured to said housing at one end and terminates adjacent said mounting plate at the other end.

38.<sup>10</sup> Garden refuse shredding apparatus according to Claim ~~37~~<sup>9</sup>, wherein said one or more macerating means is adapted to pass in close proximity to said shroud as said rotor rotates.

39.<sup>11</sup> Garden refuse shredding apparatus according to Claim ~~38~~<sup>8</sup>, wherein said one or more macerating means is also adapted to co-act with one or more complementary protrusions on or secured to said housing and to pass in close proximity to said one or more complementary protrusions and said shroud as said rotor rotates.

40.<sup>12</sup> Garden refuse shredding apparatus according to Claim ~~39~~<sup>11</sup>, wherein said one or more macerating means includes a block, lug, blade, or the like which is adapted to pass in close proximity to said one or more complementary protrusions and to force refuse into engagement with

said complementary protrusions thereby macerating refuse adjacent said protrusions as said rotor rotates.

<sup>7</sup>  
41. Garden refuse shredding apparatus according to Claim <sup>5</sup>34, wherein the inner end of the or each elongate chipper blade passes in close proximity to said one or more complementary protrusions and said one or more elongate chipper blades extend to the periphery of said mounting plate.

<sup>13</sup>  
42. Garden refuse shredding apparatus according to Claim <sup>1</sup>32, wherein said drive means is an internal combustion engine and said drive shaft or hub is coaxial with and connected to the output shaft of said engine for rotation therewith.

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<sup>14</sup>  
43. Garden refuse shredding apparatus according to Claim <sup>13</sup>42, wherein said drive shaft or hub is supported in a bearing which is mounted to a wall through which said drive shaft or hub extends and said bearing is adapted to bear axial working loads applied to said drive shaft or hub.

<sup>15</sup>  
44. Garden refuse shredding apparatus according to Claim <sup>14</sup>43, wherein said bearing is outside said chamber.

<sup>16</sup>  
45. Garden refuse shredding apparatus according to Claim <sup>15</sup>44, wherein said bearing is a self-aligning bearing having an inner race which is locked to said drive shaft or hub for rotation therewith.

<sup>17</sup>  
46. Garden refuse shredding apparatus according to Claim <sup>15</sup>44, wherein said bearing is a flange mounted bearing which is bolted to said housing by two or more bolts and the heads of said bolts form said complementary protrusions.

<sup>18</sup>  
47. Garden refuse shredding apparatus according to Claim <sup>17</sup>46, wherein said bolt heads are substantially cylindrical and have ribs or other protrusions thereon adapted to grip garden refuse as said rotor rotates.

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48. Garden refuse shredding apparatus according to Claim 44<sup>15</sup> including an engine mounting base operatively connected to said housing and spaced from said housing wall to provide access to said bearing and wherein said internal combustion engine is mounted on said base.

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49. Garden refuse shredding apparatus according to Claim 32<sup>1</sup>, wherein said drive means is an electric motor.

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50. Garden refuse shredding apparatus according to Claim 43<sup>14</sup>, wherein said wall through which said drive shaft or hub extends is a first wall of said housing and said housing includes a second wall spaced from said first wall, said first wall being operatively connected to said second wall for pivoting movement relative thereto about a pivot axis from a closed position in which said first and second walls together define at least in part said chamber and enclose said rotor and an open position in which said rotor is exposed to allow manual removal of refuse from said chamber.

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51. Garden refuse shredding apparatus according to Claim 50<sup>20</sup>, wherein, in use, said first wall is an upper wall and said second wall is a lower wall and a set of wheels and/or skids are operatively connected to said lower wall for supporting said housing thereon.

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52. Garden refuse shredding apparatus according to Claim 32<sup>1</sup>, wherein said fan means is adapted to induce air flow through said feed hopper to assist in feeding refuse through said refuse inlet.

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53. Garden refuse shredding apparatus according to Claim 52<sup>23</sup>, wherein said housing forms an expanding outflow passage from said chamber to said discharge outlet.

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54. Garden refuse shredding apparatus as claimed in Claim 53<sup>24</sup>, wherein said chamber is a volute shaped chamber.

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55. Garden refuse shredding apparatus according to Claim 33<sup>2</sup>, wherein said fan means includes one or more fan blades mounted on the side of the mounting plate opposite to said one or more macerating means.

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56. Garden refuse shredding apparatus according to Claim 33, wherein said shredding rotor is mounted for rotation in use about a generally upright axis, said refuse inlet opens generally upwards, said feed hopper extends upwardly from said refuse inlet, said one or more macerating means extend upwardly from said mounting plate on the side proximal to said refuse inlet and said fan means extends downwardly from said mounting plate on the side distal from said refuse inlet.

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57. Garden refuse shredding apparatus according to Claim 32, wherein said inlet has a leading edge and a trailing edge adjacent said rotor and relative to its rotation and stop means extend across said refuse inlet adjacent said trailing edge against which refuse may rest as it is chipped by said one or more chipper blades.

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58. Garden refuse shredding apparatus according to Claim 37, wherein said refuse inlet opens onto a portion of said mounting plate extending across at least the outermost one third of its diameter.

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59. Garden refuse shredding apparatus according to Claim 38, wherein each of said at least one chipper blade extends across at least the outermost one third of the diameter of said mounting plate.

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60. Garden refuse shredding apparatus including:

- a housing defining a chamber having a refuse inlet for receiving refuse therethrough and a discharge outlet through which shredded material may be discharged;
- a feed hopper in communication with said refuse inlet for directing refuse through said refuse inlet into said chamber;
- a rotor mounted in said chamber to a drive shaft or hub extending through a wall of said housing, said rotor including a mounting plate connected to and adapted to rotate with said drive shaft or hub about its axis, and one or more chipper blades integral with or mounted to said mounting plate for rotation therewith; and
- an internal combustion engine having an output shaft co-axial with and solidly connected to said drive shaft or hub for causing said rotor to rotate, said drive shaft or hub being supported in a bearing which is mounted to said wall through which said drive shaft or hub extends and said bearing is adapted to bear axial working loads applied to said drive shaft or hub.

<sup>35</sup>  
61. Garden refuse shredding apparatus according to Claim <sup>34</sup>60, wherein said drive shaft or hub has a central bore and the output shaft of said engine is engaged in said central bore.

<sup>34</sup>  
62. Garden refuse shredding apparatus according to Claim <sup>35</sup>61, wherein said drive shaft or hub is locked to said output shaft by a key extending through the wall of said drive shaft or hub and engaging with a key way in said output shaft.

<sup>37</sup>  
63. Garden refuse shredding apparatus according to Claim <sup>36</sup>62, wherein said key is secured by a collar extending about said drive shaft or hub.

<sup>38</sup>  
64. Garden refuse shredding apparatus according to Claim <sup>37</sup>63, wherein said collar includes grub screws which engage with said key.

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<sup>39</sup>  
65. Garden refuse shredding apparatus according to Claim <sup>34</sup>60, wherein said bearing is outside said chamber.

<sup>40</sup>  
66. Garden refuse shredding apparatus according to Claim <sup>39</sup>65, wherein said bearing is a self-aligning bearing having an inner race which is locked to said drive shaft or hub for rotation therewith.

<sup>41</sup>  
67. Garden refuse shredding apparatus according to Claim <sup>34</sup>60, wherein said bearing is a flange mounted cam lock bearing which is bolted to said housing wall and cam locked to said drive shaft or hub.

<sup>42</sup>  
68. Garden refuse shredding apparatus according to Claim <sup>34</sup>60, including an engine mounting base operatively connected to said housing and spaced from said housing wall to provide access to said bearing and wherein said internal combustion engine is mounted on said base.

<sup>43</sup>  
69. Garden refuse shredding apparatus according to Claim <sup>34</sup>60, wherein said mounting plate is spaced from said wall and said drive shaft or hub between said wall and said mounting plate is enclosed by a shroud extending about said drive shaft or hub.

<sup>44</sup>70. Garden refuse shredding apparatus according to Claim <sup>43</sup>69, wherein said rotor includes one or more macerating means integral with or mounted to said mounting plate for rotation therewith adjacent said shroud and adapted to macerate refuse fed into said chamber.

<sup>45</sup>71. Garden refuse shredding apparatus according to Claim <sup>34</sup>60, including fan means in fluid communication with said chamber for creating an outflow of air through said outlet.

<sup>44</sup>72. Garden refuse shredding apparatus according to Claim <sup>45</sup>71, wherein said fan means are integral with or mounted to said mounting plate for rotation therewith.

<sup>47</sup>73. Garden refuse shredding apparatus including:  
a housing defining a chamber having a refuse inlet for receiving refuse therethrough and a discharge outlet through which shredded material may be discharged;  
a feed hopper in communication with said refuse inlet for directing refuse through said refuse inlet into said chamber;  
a rotor mounted in said chamber to a drive shaft or hub extending through a wall of said housing, said rotor including a mounting plate connected to and adapted to rotate with said drive shaft or hub about its axis, and one or more chipper blades integral with or mounted to said mounting plate for rotation therewith, said wall through which said drive shaft or hub extends being a first wall of said housing and said housing including a second wall spaced from said first wall and said first wall being operatively connected to said second wall for pivoting movement relative thereto about a pivot axis from a closed position in which said first and second walls together define at least in part said chamber and enclose said rotor and an open position in which said rotor is exposed to allow manual removal of refuse from said chamber; and  
drive means operatively connected to said drive shaft or hub for causing said rotor to rotate.

<sup>46</sup>74. Garden refuse shredding apparatus according to Claim <sup>47</sup>73, wherein, in use, said first wall is an upper wall and said second wall is a lower wall and a set of wheels and/or skids are operatively connected to said lower wall for supporting said housing thereon.

<sup>49</sup> 75. Garden refuse shredding apparatus according to Claim <sup>48</sup> 74, wherein said shredding rotor is mounted for rotation in use about a generally upright axis, said refuse inlet opens generally upwards, said refuse inlet is adjacent the periphery of said first wall, said feed hopper extends upwardly from said refuse inlet and said pivot axis is adjacent said refuse inlet.

<sup>50</sup> 76. Garden refuse shredding apparatus according to Claim <sup>49</sup> 75, wherein said discharge outlet is generally opposite said refuse inlet.

<sup>51</sup> 77. Garden refuse shredding apparatus according to Claim <sup>49</sup> 75, wherein said chamber is volute shaped and expands towards said discharge outlet.

*Art* <sup>52</sup> 78. Garden refuse shredding apparatus including:  
a housing having first and second housing parts defining a chamber, said first housing part being movable relative to said second housing part from an operative closed position to an open position for manual removal of refuse from said chamber;  
an electric motor operatively connected to said first housing part;  
a rotor mounted in said chamber, said rotor including a mounting plate connected to the output shaft of said electric motor and adapted to rotate therewith about the axis of rotation of said output shaft, and one or more chipper blades integral with or mounted to said mounting plate for rotation therewith; and  
brake means adapted to brake said rotor when said housing parts are in the open position.

<sup>53</sup> 79. Garden refuse shredding apparatus according to Claim <sup>52</sup> 78, wherein the output shaft of said electric motor extends through a wall of said first housing part and said first housing part is operatively connected to said second housing part for pivoting movement relative thereto about a pivot axis adjacent a peripheral edge of said second housing part.

<sup>54</sup> 80. Garden refuse shredding apparatus according to Claim <sup>52</sup> 78 or Claim <sup>53</sup> 79, wherein said brake means includes a rotating drum or disc connected to said output shaft and a friction brake pad operatively connected to said first housing part and adapted to move from a disengaged position to an engaged position in contact with said rotating drum or disc.

<sup>55</sup>  
81. Garden refuse shredding apparatus according to Claim <sup>54</sup>80, including biasing means adapted to bias said friction brake pad towards engagement with said brake drum or disc and retaining means adapted to retain said friction brake pad in said disengaged position while said first and second housing parts are in the closed position and to release said friction brake pad to allow movement to said engaged position when said first and second housing parts are moved towards the open position.

<sup>56</sup>  
82. Garden refuse shredding apparatus according to Claim <sup>52</sup>78 or Claim <sup>53</sup>79, including control means adapted to cut the electricity supply to said electric motor upon movement of said first and second housing parts towards the open position.

<sup>57</sup>  
83. Garden refuse shredding apparatus according to Claim <sup>54</sup>82, wherein said control means includes an on/off switch adapted to be switched to the off position by said brake means upon movement of said first and second housing parts towards the open position.

<sup>56</sup>  
84. Garden refuse shredding apparatus according to Claims <sup>57</sup>81, wherein said brake means includes a brake actuation member moveable between engaged and disengaged positions corresponding to the engaged and disengaged positions of said friction brake pad and said retaining means includes a retaining member for selectively retaining said actuation member in the disengaged position.

<sup>59</sup>  
85. Garden refuse shredding apparatus according to Claim <sup>58</sup>84, wherein said retaining member is a post connected to said second housing part and adapted to extend through an aperture provided in said first housing part when said first and second housing parts are in the closed position and said actuation member is adapted to releasably engage with said post to retain said friction brake pad in the disengaged position.

<sup>60</sup>  
86. Garden refuse shredding apparatus according to Claim <sup>59</sup>85, wherein said locking post has a waist and said actuation member has a keyhole slot adapted to releasably engage said waist.



<sup>61</sup>  
87. Garden refuse shredding apparatus according to Claim <sup>58</sup>84, wherein said biasing means includes a helical coil spring under tension extending from said actuation member to said first housing part.

<sup>62</sup>  
88. Garden refuse shredding apparatus according to Claim <sup>55</sup>81, including locking means adapted to lock said first and second housing parts in the closed position while said brake means is in the disengaged position.

<sup>29</sup>  
89. Garden refuse shredding apparatus according to Claim <sup>1</sup>32, wherein said refuse inlet is a first refuse inlet and said housing includes a second refuse inlet through which branches and the like can be fed to the rotor.

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<sup>30</sup>  
90. Garden refuse shredding apparatus according to Claim <sup>29</sup>89, wherein said second refuse inlet has a tubular guide or hopper in communication therewith adapted to act as a bearing surface for refuse.

<sup>31</sup>  
91. Garden refuse shredding apparatus according to Claim <sup>30</sup>90, wherein said first and second inlets are arranged such that the outer portion of the or each chipper blade passes across said second inlet while the whole of the or each chipper blade passes across said first inlet.

<sup>32</sup>  
92. Garden refuse shredding apparatus according to Claim <sup>31</sup>91, wherein said first refuse inlet extends across about between one-half and three-quarters of the rotor's radial extent while the second inlet extends across about the outer one-quarter to one-half of the rotor's radial extent.

<sup>33</sup>  
93. Garden refuse shredding apparatus according to Claim <sup>32</sup>92, wherein said first inlet extends across the outer two-thirds of the rotor's radial extent while the second inlet extends across the outer one-third of the rotor's radial extent.--